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Nomads (Yürüks) and Environment in Early Modern Halkidiki¹

The interaction between man and nature has changed dramatically in the 20th century, has disturbed the balance of two and the consequences of this development has evolved out of control for both nature and humankind. This situation led to an increasing involvement of scientists with the environment, in order to reappraise the role of human beings in it and thereby to become more feasible protection of the environment. This turn has led, among other things, to the emergence of the new field of the environmental history in the USA during the '70s. Since then there has been a bloom of the field, initially in the USA and then in Europe with different focuses on the environment in each of them. In USA the environmental history in principle focused on the impact of European colonization in the Americas and the issue of exhaustion of natural resources. In contrast, Europeans were particularly interested in the environmental impact of industrialization of the cities and in the fate of forests, namely the problem of deforestation.² The field experts have formulated in three levels the work that a historian can contribute to the study of the environment: a) the study of the environment *per se*. At this level the collaboration of historians with other specialists (environmentalists, biologists, geologists, etc.) is obvious and should be

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1. I wish to thank my colleagues Prof. of Early Modern History Vassilis Gounaris and Ass. Prof. Elias Kolovos of Ottoman History for commenting on an early version of the present paper.

2. Cf. the very comprehensive review of the historiography on the environmental history in: Vaso Seirinidou, «Οι ιστορικοί στη φύση: Μια εισαγωγή στην περιβαλλοντική ιστορία», *Τα Ιστορικά* 26.51 (Dec. 2009): 275-97.

close. b) Relations and environmental interaction with socio-economic factors. At this level the changes or developments that occur in the environment in relation to changes in human society or economy and vice versa are studied. c) A third level is dealt with the intellectual history and it is concerned about perceptions of the past about nature and man's relations with it.³ The three levels of the study of environmental history do not necessarily coexist simultaneously within the same research project. A survey may analyze just one level, and its findings may be of supplementary and auxiliary value to another.

In the interaction of environment with human society topics such as the development of settlement network and demographic change, the proprietary rights of land and the rural economy play an important role. Essentially, in this level *par excellence* the interest lays both on human activity that determines and/or affects the environment, and on the influence of the environment in the local society and economy. Through this approach the historian uses various methodological tools of other sciences such as geography, demography, economics, social anthropology, in connection to those of biology, agricultural economics, botany–zoology, geology, climatology, etc., in order to achieve his/her scope.

The history of the Ottoman world in a purely environmental perspective has given just recently interesting examples of research. More specifically, two monographs have been published the same year by the same publishing house. The first one⁴ is about the impact of the “Little Ice Age” in Ottoman Anatolia at the turn of the 16th to the 17th century and its connection with the problem of rebellions

3. Donald Worster, “Doing Environmental History,” in *The Ends of the Earth*, ed. Donald Worster (Cambridge: Cambridge University Press 1989), 293. Sometimes, to this trilateral level a fourth one is added, which concerns with the environmental policy implementing by the states. Timo Myllyntaus, “Environment in Explaining History,” in *Encountering the Past in Nature*, eds. T. Myllyntaus and M. Saikku (Ohio: Ohio University Press, 2001), 152-55.

4. Sam White, *The Climate of Rebellion in the Early Modern Ottoman Empire* (Cambridge: Cambridge University Press, 2011).

occurred at the same time and in the same region. The second⁵ studies the decentralized role of the Egyptians in the management of the Nile's irrigation system and the positive response of the central Ottoman government to local initiatives. Both topics concern crucial research questions of the Ottoman history and it is very important that an environmental perspective has been given to them.⁶ In addition, the study on Egypt revealed that local history can adequately contribute to a wider synthesis for an environmental history of the Ottoman Empire.

The study of a particular region through the prism of environmental history is the subject of a project launched by the International University of Greece (IUG) within the framework of the program "Excellence II." The area under study is Halkidiki through centuries from antiquity until present day. This paper is part of the findings of the research on the early modern period (15th-18th c.), conducted by the present author together with the Assistant Professor at the University of Crete, Dr. Elias Kolovos.

One of the main changes that occurred in the area of Halkidiki in the early modern era was the arrival of new settlers and the occupation of space by them. This fact in itself raises a number of questions such as: who were the new settlers and what kind of changes did they provoke? Where did they settle in? What were their relations with the local people? To what extent was the settlement network reshaped due to the arrival of the newcomers? To what extent financial

5. Alan Mikhail, *Nature and Empire in Ottoman Egypt. An Environmental History* (Cambridge: Cambridge University Press, 2011).

6. For the reception of these two studies in the field of environmental history see the book review of Karl Appuhn, "The Nature of Ottoman History. Review Article," *Eighteenth-Century Studies* 46.2 (2012): 302-06. On the influence of the book of Fernand Braudel for the Mediterranean (*La Méditerranée et le monde méditerranéen à l'époque de Philippe II*, Paris 1949), some historians has tried to incorporate a geographical perspective in their studies and thus to discuss issues regarding the influence of the environment, and especially of the climate, on Eastern Mediterranean. For some early studies see a bibliographical survey in: Gustaf Utterström, "Climatic Fluctuations and Population Problems in Early Modern History," in Worster, *The Ends of the Earth*, 69-77.

balance was overturned or the new tax regime affected both locals and newcomers? What was the impact of the new settlers on the environment, especially as regards the equilibrium between cultivated and grazing areas or in the shrinkage or disappearance of forestlands?

The Ottoman conquest of the Balkans was followed by a massive immigration of Muslim populations from Anatolia to the Balkans from the late 14th century onwards. There were two main groups of immigrants: *Türkmen* nomads and Muslim craftsmen. The formers scattered in the countryside, while the latter settled in towns. The nomadic populations in the Balkans and Western Anatolia were known in the Ottoman administrative language as *Yürüks*⁷ (obviously from the Turkish verb *yürüme* = to walk), a term that did not have a national, ethnic or tribal meaning, but was simply used by the Ottoman bureaucracy to differentiate these populations from other nomads of the Ottoman Empire.⁸ Therefore, both administratively as well as in their socio-economic organization these populations differed from the nomads (*Türkmens*) of the Central and Eastern Anatolia. While the *Türkmens* maintained their tribal way of organization, the *Yürüks* were organized by the state in a military base from the beginning of their history. According to this organization, the *Yürüks* were divided into “hearths” (*ocaks*) of 25 persons, of which 20 were auxiliary soldiers and 5 participated in campaigns. In peacetime they were obliged to offer services for the state such as in con-

7. Classical work for the study of *Yürüks* is Mehmed Tayyib Gökbilgin, *Rumeli’de Yürükler, Tatarlar ve Evlâd-ı Fatihân* (Istanbul: Osman Yalçın Matbaası, 1957). Basic is also the article: Halil İnalçık, “The Yürüks: Their Origins, Expansion and Economic Role,” in idem, *The Middle East and the Balkans Under the Ottoman Empire. Essays on Economy and Society* (Bloomington: Indiana University Press, 1993), 97-136. Finally, see recently: Reşat Kasaba, *A Moveable Empire. Ottoman Nomads, Migrants, and Refugees* (Seattle-London: University of Washington Press, 2009); Harun Yeni, “The Yürüks of Ottoman Western Thrace in the Sixteenth Century,” unpublished PhD, Bilkent University, Ankara 2013.

8. For the meaning of the term *Yürük*, see İnalçık, “The Yürüks,” 103.

struction of public works (e.g., building of bridges or repair of castles).⁹ Although manpower was necessary for military organization, not all Balkan *Yürüks* were enrolled in this system. In principle, the state itself decided, based on its needs, how many of these people were needed and had to be recorded in special registers (*yürük defterleri*).¹⁰ This last fact further complicates the attempt for a quantitative estimation of the *Yürük* population who settled in the Balkans, since all *Yürüks*, in theory and in practice, were not registered in these cadastres.

Their arrival in the Balkans was not a one-off thing, but they immigrated in waves. Current research cannot determine the phases of the migratory waves and of the sedentarization process of these populations. Particularly for the area under study it is suggested that *Yürüks* had arrived as early as the last decade of the 14th century in the region of Thessaloniki, after the first Ottoman conquest of the city in 1387, as a result of the state policy of forced migrations (*sürgüns*).¹¹ To these *Yürük* groups was given the special name “*Yürüks* of Thessaloniki” (*Selanik Yürükleri*) so as the Ottoman state distinguished them in terms of administrative and fiscal status from other

9. Gökbilgin, *Rumeli’de Yürükler*, 38; Harun Yeni, “The Utilization of Mobile Groups in the Ottoman Balkans: A Revision of General Perception,” *Arhiv Orientalni/Oriental Archive* 81 (2013): 186-90.

10. Yeni, “The Utilization,” 198-202. Yeni estimates that in Western Thrace, during the 16th c., only 10%-15% of the whole *Yürük* population of the region had been enrolled in the state military organization.

11. İnalçık, “The Yürüks,” 106; Vassilis Dimitriadis, “The Yürüks in Central and Western Macedonia,” in *Etnogeneza na Jurucite i nivnoto naceluvanje na Balkanot* (Skopje: Makedonska akademija na naukite i umetnostite, 1986), 9-10, where it is argued that after the first Ottoman occupation of Thessaloniki in 1387 the first wave of *Yürük* colonization in the region of Thessaloniki was observed and that in 1394 a second one was occurred. The colonization of *Yürüks* in Thessaloniki’s countryside in the reigns of Murat I and Bayezid I in 1390’s, mainly from Western Anatolia (Saruhan region) aimed at the strengthening of the city’s military defense (Nevra Necipoğlu, *Byzantium between the Ottomans and the Latins: Politics and Society in the Late Empire* [Cambridge: Cambridge University Press, 2009], 99-100; see the relevant primary source in Friedrich Giese, ed., *Aşıkpaşazade, Die altosmanische Chronik des ‘Aşıkpaşazade* [Leipzig: O. Harrassowitz, 1929], 56, 66-67).

Balkan nomad groups.¹² Other migratory waves followed until the second half of the 16th century, when the arrival of new settlers stopped.

In Halkidiki, although the first *Yürüks* should have arrived at the end of the 14th century, the first clear and measurable information available to us dated from the early 16th century. The fact that they were not registered in the fiscal cadastres of the 15th century does not mean that they were absent from the area. This is probably due either to a generally incomplete registration of taxpayers by the Ottoman authorities in this early period, or to *Yürüks*' strong nomadic character which made it difficult to register them or to the fact that the state was not interested in their systematic registration. A fourth possibility is that there existed special *Yürük* registers (*yürük defterleri*) since the 15th century, which have not been preserved, so that all nomads may be registered there. However, in 1519, when they are first recorded in ordinary fiscal registers (*tahrir defterleri*),¹³ their numbers are already noteworthy, which it suggests that they had been in an advanced stage of sedentarization. In the tax survey of that year, there were registered two *Yürük* settlements, which from then onwards would appear in the subsequent surveys as well: Ğayna in Eğri Buçak (present-day Nea Apollonia) and Serçi & Nasuh Fakih with "other name" (*nam-ı diğer* [hereafter: nd]) Rahmancı.¹⁴ In following

12. Gökbilgin, *Yürükler*, 74-78. From the *Yürük* groups of the Balkans (Naldögen, Tanrıdağı/Karagöz, Kocacık, Ofçabolı, Vize) not all of them were named after a placename. Even in the groups which bore a placename in the title, their populations were not inhabited those areas. For instance, not all of the *Selanik Yürükleri* inhabited the region around Thessaloniki, but they were settled in Thessaly as well. Thus, this term had, for the state, administrative and fiscal meaning and not geographical.

13. Actually, in the survey of 1478, it is registered one single *Yürük* in the Muslim village Dağ Gölü, in the surroundings of Hortiatıs mountain (Başbakanlık Osmanlı Arşivi, Tapu Tahrir Defteri, no. 7 [hereafter: TT 7], p. 565).

14. TT 70, pp. 9 and 7. In the first village it is noted that it concerns of a "community" (*cemaat*) of *Yürüks*.

tax surveys, besides the above two villages, *Yürüks* are also registered in other places:¹⁵ *Yürüks* are registered in the old Byzantine and already Muslim village Agathi (present-day Plagiari), as well as in the mixed village of Yerakar (present-day Gerakarou). In the Christian village Akrotir (next to Lake Volvi) in the register it is noted that a tithe is collected from *Yürük* estates within the borders of the village; the *Yürüks*, however, are not registered together with the taxpayers of the village.¹⁶ The village Aya Yorgi (east of present-day Neohori in Nea Kalikratia) had, according to the note of the register, *Yürük* cultivators, who came “from outside” (*hariçden*). The village Ilıca (Thermi Baths) was cultivated by peasants (*reayas*) from outside, while a *Yürük* winter pasture tax was collected from *Yürüks* and was registered in village’s tax revenues. In the salt producing Christian village Krini it is noted that *Yürüks* grazed their flocks and paid the pasture tax (*resm-i otlak*). In the salt producing village Mesimer the *Yürüks* who wintered their sheep there paid hearth tax (*resm-i duhan*), and so they did in the uninhabited villages Paliroz and Apanomi, in the same area. Finally, winter pasture tax or hearth tax paid by *Yürüks* is also registered in the villages Peşter (Peristera), Siğil (between N. Triglia and N. Tenedos), Tri Piğad (near today Prinohori) and Vromosirta (Aghios Panteleimon).¹⁷ Finally, in the 1568 survey there are entries for *Yürüks* in the same villages as above –although the information are more detailed concerning the group names– but *Yürüks* also appear in the villages Zumbat (Trilofos), Sığıl-ı köhne and Sarandarya nd Sığırıcı (Tagharades).¹⁸ In conclusion, villages that were exclusively

15. It is a question whether the Muslim peasants of Halkidiki were not *Yürüks*. In the present analysis, we strictly separate the term *Yürük* in order to study its dispersion, considering that for the Ottoman state, which knew very well the characterization of the two groups, the specific tax-payers were *Yürüks*. Thus, for example, the Muslim village Agathi was registered as having *Yürük* inhabitants only in the survey of 1527 (see: TT 403, p. 942).

16. It is possible that they might come from the neighbor village Eğri Buçak.

17. See respectively: TT 403, pp. 942, 843, 894, 916, 724, 705 & 737-8, 704, 727, 735, 737, 739-40, 704, 827, 718, 986, 821, and 649.

18. See respectively: TT 723, pp. 849-852, 335, 367, 227-251, 99-100, 315-6, 846-7, 914-916, 96, 88, 302-03, 346, 184-5, 171, 182, 87.

inhabited by *Yürüks* were Ilica, Turhanlu (Lakkia), Tuzcılar (Souroti), Karaçulhalı (Kardia), which bore Turkish names and were placed in the valley of Vassilika, as well as Sarantarea and Agathi, who preserved their Byzantine names albeit inhabited by Turkish colonizers.

Based on the taxation we cannot establish a direct relation between the amount paid for the taxes on stock breeding in a settlement and the number of *Yürüks* lived in this settlement. Having as an example the more complete survey of 1568, we put forward the following data: out of the 34 settlements (villages and *mezraas*) taxed with a tax per flock (*resm-i ağıl*), none included *Yürüks* among the taxpayers, while in those that included Muslims, Christians were the majority. It is characteristic that the village Maruda nd Karvya (Nea Silata), who had a lot of Muslims, paid one of the lowest amounts for that tax (28 *akçes*). The picture was somewhat different for the winter pasture taxes (*resm-i kışlak*). There were *Yürük* villages (e.g. Tuzcılar) who paid a quite high amount of the tax, but it was the *mezraa* (uninhabited cultivated land) Aya Yorgi, where it was not only noted that the tax was paid by *Yürüks*, but it paid by far the highest amount (1,654 *akçes*). The sheep tax (*adet-i ağnam, resm-i ğanem*) is also an interesting case. By far the highest amount (8,577 *akçes*) was paid by the *Yürük* village Tuzcılar. The amounts of taxation, however, cannot be matched to a number of sheep and goats. Since there is not preserved any tax regulation (*kanunname*), which would indicate the rates of taxation in the region, only estimates can be made, taking into consideration the extant tax rates elsewhere in the Greek lands. Assuming that each sheep or goat was taxed with 0.5 or 1 *akçe*,¹⁹ only Tuzcılar should have had around 4,200 or 8,500 sheep and goats. Perhaps it is more interesting the fact that among

19. See the very useful table with the amounts of the sheep taxes in the Greek lands in: John C. Alexander, *Toward a History of Post-Byzantine Greece: The Ottoman Kanunnames for the Greek Lands, circa 1500-circa 1600* (Athens: s.l., 1985), 481 and also 475-80 for the taxes. The Ottoman fiscal terminology did not distinguish sheep from goats, so that it is impossible to know which kind of animals were grazed. Goat grazing aggravates much more the environment than sheep grazing.

the other eight villages taxed with 1,000 *akçe* or more –which therefore had as many or twice as many sheep and goats– only Marudan and Karvya had *Yürüks* among the village tax-payers.

In the survey of 1568 the number of *Yürük* communities (*cemaat*) was as follows: 12 in Eğri Buçak, 7 communities in the region of Zumbat, 7 in Andığonya, 5 in Aya Yorgi, 2 in Sarandarya, 1 in Ilıca, 1 in Hortaç. The “village” Serçi & Nasuh Fakih and Rahmancı, as noted in the register, was comprised of 81 *Yürük* communities, which administratively belonged (*tabı*) to other areas (e.g., Demirhisar, Siroz, Ustrumça).²⁰ It can be assumed that these *Yürüks* wintered in Halkidiki, without having a necessarily specific place of residence. Moreover it is stated in the register that *Yürüks* were not farmers and that they paid to the tax collector only secondary taxes.²¹ So the above hypothesis is confirmed. The fact that both in Serçi and in Eğri Buçak there was an increase in the number of their communities between 1527 and 1568 is evidence that new *Yürüks* arrived and/or just were registered in Halkidiki around the middle of the 16th century.²² The registration of *Yürüks* in the last cadastre of 1568 presents large numbers of them in other settlements too. The demographic dynamics of *Yürüks* in relation to a) other Muslims and b) the total population of Halkidiki region are reflected through their percentage in the respective categories, after taking into account all the settlements where *Yürüks* are clearly registered.

20. TT 723, p. 227: *cemaat-ı Hamzalu an kaza-ı Siroz der kurb-ı Laçko an hassa-ı muşarun ileyh* [mirmiran-ı liva-ı Selanik]; p. 230: *cemaat-ı Çoban Fakih tabı-ı Ustrumça der sınır-ı Drağolit an hassa-ı muşarun ileyh*. Some others came from other regions of Thessaloniki province. See TT 723, p. 249: *cemaat-ı Aydoğdu der kurb-ı Lahana tabı-ı Selanik*.

21. T 723, *ibid.*: *reaya-ı yürükler dir ziraat etmezler amma ekinde bennak ve mücerred resm-i niyabet ve resm-i arusane köyde virürler hassa-ı mirmir[an] liva-ı Selanik el-mezbur*.

22. The same picture of the big demographic increase was observed in other villages as well. For example, in the village Aya Yorgi 20 *Yürüks* were registered, while under the title “*Yürüks* of the *nahiye-i Sidrekapsı*” were registered 7 communities in sum (total 93 tax-payers), from which four it is noted that they were located near the village Zumbat (TT 723, pp. 367 and 182-3 respectively).

YEAR	1478	1519	1527	1568
<i>Yürüks</i> ²³	1	595	776	2,308
% of Muslims	0.3	37.1	44.5	69.5
% of the total	0.04	7.9	7.1	20.8

A few conclusions about the *Yürük* presence in Halkidiki may be drawn through the analysis of the registers of the 16th century. a) Although the first sultans settled nomads in the region of Thessaloniki, we cannot be sure of their numbers and of their settlements. Probably for reasons of government policy (i.e., they were only included in the special *Yürük* registers) they were not recorded in registers of the 15th century, while there is an ever growingly meticulous policy of recording them in the 16th century. Therefore, judging retrospectively, we assume what their original location would be and we draw a picture of their population dynamics. b) Their spatial dispersion was concrete. *Yürüks*' winter settlements in Western Halkidiki seem to be predominant in Kalavros and at the hilly area to the south and less on the south slopes of Hortiatis Mountain. That finding is also evident from the distribution of their settlements in the 19th century and in the early 20th.²⁴ Their settlements corresponded exactly to the current zone of maquis. That means that they settled in the immediate area southeastwards of Thessaloniki, in Kalamaria, extended to the area just north of Nea Moudania. Their second habitation zone was the area of Nea Apollonia (next to Lake Volvi), where Eđri Buçak was the unique village of Halkidiki founded by these populations. Except for this village, the *Yürüks* did not create any other villages. They either settled at the outskirts of former (by then abandoned) Christian (or inhabited by Christians) villages²⁵ or

23. The *Yürüks* of Eđri Buçak are added, who are registered as Muslims and in a note it is referred that they were sedentarized *Yürüks* (*yerli Yürükler*).

24. Paul Bellier et al., *Paysages de Macédoine* (Paris: Centre de Recherche d'Histoire et Civilisation de Byzance, 1986), map out of text no. 2.

25. The cultivation of the lands of *mezraa* type is interpreted this way.

they created their own settlements (*mahalle, cemaat*), which are registered as such in the administrative and fiscal sources.²⁶ c) The gradual increase in numbers led them to reach the highest percentage among the Muslims in Halkidiki and the one fifth of the total population of Halkidiki.²⁷ However, more important for their demographic and economic dynamics is the very nature of these populations.²⁸

Based on the Ottoman tax registers we can discern two *Yürük* groups. On the one hand there are the “settled ones” (*yerli Yürükler*), namely those who either were identified as such (as in the case of *Yürüks* of Eğri Buçak)²⁹ or cultivated land (as in the cases of the Christian villages Akrotir and Aya Yorgi, or the uninhabited ones Paliroz and Apanomi). They were obviously living in the settlements that they had established and came within the borders of old villages just to cultivate the land.³⁰ These *Yürüks* constituted the smaller part of *Yürüks* in Halkidiki, at least in the 16th century. On the other hand there were those who remained in a nomadic or semi-nomadic stage. They had a dual origin: a) *Yürüks* coming from outside Halkidiki (e.g., Serres region) and whose flocks wintered in the lowlands and semi-mountainous parts of Halkidiki and b) *Yürüks* who lived in communities of Halkidiki and were mainly or exclusively engaged in agriculture, moving within a small geographical radius range of

26. Apart from Eğri Buçak, the only villages bore Turkish names were the transformations of the initially *Yürük* communities into villages during the 16th and 17th c., e.g., the villages Uzun Ali (Plagiari), Üç Ev (Neohoraki) etc.

27. It has not been studied yet any register (*yürük defteri*) for *Selanik Yürükleri*, which might register the *Yürüks* belonged to the state military organization, so that we could see their percentage. Such a study has been conducted for the *Tanrıdağı Yürükleri*. See above the bibliography in fn. 10.

28. Elias Kolonos, «Χωρικοί και μοναχοί στην οθωμανική Χαλκιδική, 15^{ος}-16^{ος} αιώνας», unpublished PhD, Aristotle University of Thessaloniki, 2000, vol. I, 84-86 and 102-03; vol. II, 58-59 and 106-09.

29. See for example TT 403, p. 678, where they were registered to pay regularly all the agricultural taxes the ordinary peasants paid.

30. For the presence of *Yürüks* in Christian villages see Dimitriadis, “The *Yürüks*,” 11.

few kilometers from their location and paid the corresponding live-stock tax. The first constituted the great “village” Serçi & Nasuh Fakih nd Rahmancı, which was an inclusive and more administratively than geographically localized village. These were by far the most in terms of population numbers. Settled *Yürüks* who exclusively were occupied in agriculture also existed in significant numbers. Taxing them with the personal tax (*resm-i çift*) was seen as an attempt by the state to maintain their nomadic character and thus their military organization, which was necessary for the central government. Thus, through rural taxation, the state “punished” in a way those *Yürüks* who wanted to stop providing military services to the state and to become ordinary peasants (*reaya*).³¹ Nevertheless, the *Yürüks* of Halkidiki did not differ (with regard to the issue of settlement) from the other *Yürüks* of the Balkans, where the main feature, in contrast to the Anatolia, was the initially semi-nomadic and subsequently sedentarized nature of the former in contrast to the latter.³²

The decrease in their population³³ from the late 16th century until the end of the next century forced the State to proceed with a detailed registration of them in order both to stop the wave of abandonment of the military organization and their integration into the same fiscal units with common peasants, and to use them in that difficult period for the state, because of the long war with Austria (1684-1699).³⁴

31. Gökbilgin, *Yürükler*, 48-49. This policy was followed until 1576, according to M.T. Gökbilgin.

32. İnalçık, “The Yürüks,” 110. See the statement of the English traveler William M. Leake, (*Travels in Northern Greece*, vol. III [London: J. Bodwell, 1835], 175) as early as the beginning of the 19th c.: *The Yürüks, who in Asia live a wandering life, like the Kurds and Turkomans, as their name implies, have become more sedentary in Macedonia and Thrace, where they have villages, and have become cultivators.*

33. The decrease in numbers does not mean that people migrated to other regions; more probable is that they avoided enrolling in the military *Yürük* organization.

34. See the order (*ferman*) published in Ioannis K. Vasdravellis, ed., *Ιστορικά Αρχεία Μακεδονίας, τ. Β΄: Αρχείον Βεροίας* (Thessaloniki: Society for Macedonian Studies, 1954), 80-81 (of 1682). See also Reşat Kasaba, “From moveable empire

The survey, which covered all the Balkans, was conducted in 1691 and had for Halkidiki the following results:³⁵

<i>NAHIYE</i>	COMMUNITIES	SOLDIERS
Pazargâh	27	375
Boğdan	14	335
Kelemerye	32	696 ³⁶
TOTAL	73	1.406

If the survey of 1568 is taken as a yardstick, it results that while the number of *Yürük* communities did not particularly decrease,³⁷ in contrast, it significantly decreased the number of tax-payers, should have the *neferan* of 1691 corresponded with the *hanes* and *mücerreds* of 1568.

From the above analysis it results that in Halkidiki during the early modern era there existed *Yürüks* in the form both of completely sedentarized peasants and of purely nomads. However, the trend, as generally in the Balkans, was their permanent sedentarization. Thus, after the last survey of 1568 and by 1691 *Yürüks*' demographic and urban picture was crystallized and they fully incorporated into the rural society and economy of the region. The arrival of nomads in a society (and economy) of settled peasants caused problems of adaptation to the new life. The older historiography has stressed the conflicting nature of the relations between nomads and peasants. In Halkidiki, the arrival of *Yürüks* led to a long period of adaptation to the

to immovable state: Ottoman policies towards nomads and refugees in the modern era," *New Perspectives on Turkey* 45 (2011): 230-31.

35. Gökbilgin, *Yürükler*, 263-65; Vassilis Dimitriadis, «Φορολογικές κατηγορίες των χωριών της Θεσσαλονίκης κατά την Τουρκοκρατία», *Μακεδονικά* 20 (1980): 404-06.

36. Dimitriadis calculates "596" soldiers, whereas the correct sum is 696! (*Ibid.*, 406).

37. We cannot be able to identify the settlements in the two surveys. A few communities of the survey of 1568 there were succeeded in identifying with those of the survey of 1691. However, it should be bear in mind that in the second survey the *Yürük* communities had been settled, while in the former they belonged to regions, which are located more or less outside Halkidiki (e.g., Sidirokastro, Serres).

peasant life, which often resulted to conflicts.³⁸ The *Yürüks* did not settle in deserted land, but in an area, where there existed for a long time ago a well-structured settlement network. Thus, the occupation of space caused pressure to peasants. The elements and the phases of this relation can be better discerned in the area of Kalamaria, a region where there were a dense presence of *metochia* (monastic farms) and numerous *Yürük* communities. Therefore, the *Yürüks* settled in an area that was not at all deserted, but also had a large number of *metochia* together with the land belonged to Christian villages of the region.³⁹

The dispute over the delimitations of fields and estates was the most important issue that both monks and nomads were preoccupied with. In 1529 the monks of the Athonite monastery Hagios Pavlos complained for encroachment of their monastic lands by the neighboring *Yürük* community of Kūlahli.⁴⁰ In the documents the borders of the monastic lands which formed also the border with *Yürüks* were also delimited. Occasionally, the dispute concerned irrigation ditch (*savad yolu*), necessary for both animals' breeding and crop cultivation. Even this was also delimited and its ownership was claimed.⁴¹ In other cases the accusation was the illegal transgression of *Yürük* flocks in monastic lands, a common problem in cases of peasants and nomads, who were neighbors.⁴² Illegal incoming animals were

38. It is highly probable that this tension resulted in the abandonment of the village Siğil between 1527 and 1568 and the movement of the inhabitants to the village Rossaiou (which took the name Siğil) in corroboration with the simultaneous settlement of in the lands of the old Siğil (Kolovos, «Χωρικοί και μοναχοί», vol. 3, 109).

39. The next section is based on the Ottoman archive of the Athonite monastery of Hagios Pavlos, which possessed a big *metochion* in Kalamaria and neighbored with a *Yürük* community.

40. The documents are: Archive of the Monastery of Hagios Pavlos [hereafter: AMHP], K/28 (1529) and K/15 (1567). For the topic see: Phokion Kotzageorgis, *Η αθωνική μονή Αγίου Παύλου κατά την οθωμανική περίοδο (14^{ος} αι. -1830)* (Thessaloniki: University Studio Press, 2002), 92-96 and 85-86 and the bibliography.

41. AMHP, K/5 (1587), K/77 (1588).

42. AMHP, K/26 (1542), K/25 και K/42 (1586), K/10 (1588).

generally described in the documents as pack animals or sheep (*tavarlarını [ve koyunlarını] saltvirüb*).⁴³

Besides Kalamaria, disputes between monks and *Yürüks* were also observed in Sithonia peninsula. In this case the trespassers apparently came from the region of Pazargâh (Nea Apollonia), since *Yürük* communities were not located on the peninsula of Sithonia and therefore were not neighbors of any *metochion*.⁴⁴ It is mostly interesting that sometimes in Ottoman court the *Yürüks* cooperated with local Christians against the monks, thus showing the formation of a kind of alliances between settled peasants and nomads. In 1625 two *Yürük* shepherds transgressed with their flocks into the winter pasture of Kriaritsi, and they had received a title deed (*tapu*) from the previous tax collector (*zabıt*) of the region for the sheepfold, which was built inside the winter pasture lands. When the monks brought a document in favor of their claims and they demanded the defendants to withdraw the flocks within two months, the latter, having been supported by the Christians of the nearby village of Sykia, disappeared and did not present on trial.⁴⁵

The claims of ownership in Kalamaria concerned an attempt for searching for a *modus vivendi* between the monks and their new neighbors. When we look at the years the relevant documents were issued or the dispute had been revived (1529, 1542, and 1567), we find that they coincide with years of tax surveys with the exception of the period 1586-88. It can thus be suggested that monks claimed over the land ownership so as to secure their estate properties in view of the upcoming tax survey. In one case, indeed, in 1548, the dispute was not with *Yürüks* in general but with their *sipahı*, who asserted the Athonite *metochion* as part of his fief and hence claimed the owed taxes. The presentation of the relevant entry from the recent

43. AMHP, K/26 (1542), K/15 (1567), K/25, K/42 (1586), S/5 (1595).

44. AMHP, S/5, 9-1 και Kr/6 (1595). Cf. Kotzageorgis, *Η αθωνική μονή*, 112.

45. AMHP, Kr/1, Kr/2, 7 and 8 fol. 6 (all from December of 1625 with a few days interval).

tax register (1542) by the monks, which showed that the estate belonged to another fief-holder, vindicated the monks.⁴⁶ It is also interesting that all relevant documents were issued in the spring. Obviously, once *Yürüks* started using the monastic lands for wintering their flocks, the monks responded by demanding the issuance of official documents (*fermans, hüccets*).

Sometimes, the dispute took acute form. In 1562 three *Yürük* shepherds were accused by the monks, because not only they transgressed the land of their estates, but also wounded one of the monks when he tried to stop them.⁴⁷ In 1599 two *Yürük* shepherds were blamed for beating a monk of the monastery of Hilandar. With the intervention of shepherds' employers, who were set as guarantors of their employees, accusations were dropped.⁴⁸ Finally, the monks could also experience indirectly repercussions from the activity of *Yürüks*. When in 1605 the *Yürük* village *Külahlı* suffered a bandits' attack that killed few of the inhabitants, the latter asked the monks to seize their neighbor *metochion* as a compensation for the damage. When the monks refused and appealed on trial, the *Yürüks* reacted by refusing to appear in court; moreover, they got money from the monks using violence, they harassed nine people in the *metochion*, of which the four finally died.⁴⁹ The decree that describes the incident orders the judge (*kadı*) to punish the culprits.

Based on monastic archival material, the cases of disputes over land ownership between *Yürüks* and monks in Kalamaria stopped in the late 16th century. The first document which shows that the relations between the two groups entered into a new phase dated from at least as early as 1599, when the first attested attempt at settling an agreement between the two parties took place. The monks agreed that two *Yürüks* –with whom they had hitherto disputes– could graze their flocks in the pasture land of the *metochion*, while paying in the

46. AMHP, K/20 (1548).

47. AMHP, K/24. Cf. Kotzageorgis, *H αθωνική μονή*, 95.

48. AMHP, K/79 (1599). For similar cases from the 17th c., see Vančo Boškov, "Jurućite i svetogorskite manastiri," in *Etmogeneza*, 60 and 66.

49. AMHP, K/11 (1605). Cf. Kotzageorgis, *H αθωνική μονή*, 95.

form of a “loan” an annual rent of 7,000 *akçes* each.⁵⁰ As characteristically stated in the document, the *Yürüks* used to graze in the pastures and in the arable land sheep, buffaloes and other animals, but the monks gave them permission to graze only sheep (*koyunlarını ve sığırlarını ve sair hayvanlarını metohin mezraalarında ve meralarında otlamağa [...] ancak koyunlarını getirüb otladub sığırlarını ve sair hayvanlarını getirüb otlatmayacak oldılar*). In 1610 another dispute with a *Yürük* was likewise resolved. Elhac Halil b Pir Ali claimed that he had been herding flocks in a particular location of the Kalamaria *metochion* and that he had full proprietorship on it. The monks asked for *in situ* examination of the case; the examination was conducted by members of the local court in the presence of several representatives of the local *Yürüks*. The monks won the case. However, they agreed to graze their flocks together with the *Yürük* and that the latter would pay to the monastery 100 *ğuruş* per year as a “pawn” for the use of pasture land. The monks were interested in ratifying the delimitation of their *metochion* through the issuance of another document at the same day.⁵¹ This case was not at all a unique one. A few years later, in 1620, the monks agreed with a *Yürük* named Durali Dede b Veli to graze his sheep within the lands of their *metochion* without paying rent. The *Yürük* lent the monks 5,000 *akçes* to have their monastery repaired. This affair lasted until 1629, when the monks managed to repay the loan to Durali’s son, Yunüs.⁵² In one of the documents the monks declared that their fields were a wasteland and thus suitable for grazing (*hali olan tarlalarımızda rayi ettirmeğe taahhüt olunmuş idi*). In all these documents there is a constant reference to grazing sheep and not other animals, while the disputed area is indiscriminately referred to as meadow (*mera*), winter

50. See K/68 (1605): *koyun kışlaları*; K/73 (1610): *mezraa*; K/72 (1610), K/51 (1610): *mera koyunlarını koyub*; 61, F.2 (1620), K/64 (1624), K/71 (1627): *koyunları metohumuz sınırında rayi olunmağa icazet ettik*.

51. AMHP, K/74.

52. AMHP, K/73, K/72, K/51 and Kolovos, «Χωρικοί και μοναχοί», vol. 3, 185 (no. 228). Cf. Kotzageorgis, *H αθωνική μονή*, 85.

pasture (*kışla*), or cultivated land (*mezraa*).⁵³ Similar relations of the same kind between monks and *Yürüks* are also discernible in a series of 44 loan documents (*hrestikes homologies*) from the mid-18th century in the Kalamaria *metochion*. Several of the Muslims creditors who signed in Greek documents *in situ* (i.e., in the *metochion*) could be considered descendants of the 17th century *Yürüks*.⁵⁴ It is therefore apparent that the relations between (former) nomads and peasants were not limited only to a conflict level, but that both parties tried to find ways for coexistence. It is worth mentioning that the concept of conflicting relations between peasants and nomads is considered by the historiography as a part of the “orientalist” paradigm and those who reject it tend to highlight the symbiotic relations between the two groups, despite their conflicts.⁵⁵ It is interesting that although nomadic populations from Anatolia began to settle since the early 16th century, it is, however, at the end of the next century that the Ottoman state would proceed with the compulsory settlement of nomadic populations of Anatolia. The registration, in fact, of the *Yürüks* of the Balkans in 1691 is part of this policy.⁵⁶

The late 16th century is a crucial point in time. At that period of great economic and financial crisis, the monasteries suffered significant tax burdens and faced difficulties to maintain their *metochia*.

53. AMHP, 61-2 (1620), K/64 (1626), K/71 (1627), K/54 (1629). Cf. Kotzageorgis, *Η αθωνική μονή*, 86.

54. Phokion Kotzageorgis, *Αρχείο της Ι. Μ. Αγίου Παύλου. Επιτομές εγγράφων, 1010-1800* (Athens: National Hellenic Research Foundation, 2008), nos. 47-50, 52-57 (1756), 58-71 (1757), 72, 74-77, 80-82 (1758), 83-87 (1759), 89-94 (1760), 95-98 (1761). A lot of the creditors came from the *Yürük* communities of the region, e.g. no. 47: *τηλκελίδες, ελκελη*. As late as 1799 the “powerful” (*κρατούντα*) man of Nikiti was a *Yürük* named Tilli Veli (Vassilis Anastassiadis, *Αρχείον Ι. Μ. Χιλανδαρίου. Επιτομές μεταβυζαντινών εγγράφων, 1433-1800* (Athens: National Hellenic Research Foundation, 2002), nos. 337 and 368).

55. Suraiya Faroqhi, “Ottoman Peasants and Rural Life: The Historiography of the Twentieth Century,” *Archivum Ottomanicum* 18 (2000): 160-61; Chris Gratien, “Ottoman Environmental History: A New Area of the Middle East Studies. Review Article,” *Arab Studies Journal* 20.1 (2012): 253-54.

56. Kasaba, *A moveable empire*, 53-83 (esp. 72-74 for the Balkans). See also above fn. 34.

This situation led them to neglect some of their estates, and therefore they gradually turned into fallow. This very interesting phenomenon of environmental history cannot unfortunately be generalized and documented –not yet at least– on other *metochia* or areas of Halkidiki's landscape. This development, however, is due more to economic reasons rather than to demographic ones, since there is no evidence that the population of the area –and thus the manpower– had dramatically decreased. In addition it is not at all certain that Halkidiki suffered from the 17th century climate change and that this had an impact on the environment or caused a population decrease.⁵⁷ On the other hand, the monasteries were in great need for cash in order to meet their functional expenses and to pay their growing taxes. In the Kalamaria *metochion*, vicinity to *Yürüks* led the monks to alter their relations with them: from competitors and litigants *Yürüks* become creditors. This development took place at a time when at least the Kalamaria *Yürüks* were already considered an established group and therefore the coexistence of peasants-monks with them should be taken for granted.

The arrival of immigrants in Halkidiki affected the management of landscape and natural resources by the locals. These people, by definition nomadic, came in droves in Halkidiki and chose specific areas to settle in. They settled in the maquis area, i.e., the hilly zone starting at the eastern outskirts of Thessaloniki and extending southeast to the area of present-day Nea Moudania. This area is suitable for grazing. A second area was the road passing south of the Lakes Langada and Volvi with the village Eğri Buçak (which had been founded by them) as a center of their settlements. The interim mountainous area to the west-northwest of the peninsula was also a wintering area of *Yürüks*' herds. The benign climate and the geomorphology of Halkidiki were ideal for wintering flocks. This is why the

57. For the view that climate does not change dramatically in the Ottoman lands, so that it could have an effect on the environment see Hans-Dietmar Hütteroth, "Ecology of the Ottoman Lands," in *The Cambridge History of Turkey*, vol. III: 1603-1839, ed. S. Faroqhi (Cambridge: Cambridge University Press, 2008), 22-23. For the opposite view and the influence of the "Little Ice Age" in Anatolia in the end of the 16th and the beginning of the 17th c., see Sam White, *The Climate of Rebellion*, 223-25.

area was used extensively by *Yürüks* as a winter pasture. It is documented for the 16th century that *Yürüks*' flocks from the region of Serres, Sidirokastro and even Stroumtsa, spent the winter time in Halkidiki following the route through Vertiskos Mountain and they entered Halkidiki via the lakes area. On the other hand, those *Yürüks* who chose to settle in Halkidiki, at least since the 16th century, had cultivation of land as a supplementary means of income.⁵⁸ The choice of the geographical location of *Yürüks*' settlements is corroborated to the existence of the large urban center of Thessaloniki. During the 16th century the military reasons (i.e., the defense of the city) which had been the initial impetus for the *Yürük* colonization in late 14th century⁵⁹ ceased to be significant. In the 16th century, however, there was another reason which kept *Yürüks* very close to the city. Thessaloniki was the center of the flourishing manufacture of woolen uniforms for the Janissaries corps. It was a state-owned enterprise under the management of the city's Jews.⁶⁰ Because of this manufacture, the city's needs for wool were high. The presence of stockbreeders in the immediate periphery of the city was vital for the sufficient supply of the wool manufacture. Therefore, *Yürüks* as stock breeders *par excellence* (by grazing mainly sheep even as established groups), benefited from this situation and became the basic wool suppliers to Thessaloniki.⁶¹ This is also another reason why *Yürüks* did not settle in Sithonia peninsula, which has always been a grazing zone.⁶² Consequently both ecological and economic reasons

58. A completely opposite example were the *Yürüks* of Eğri Buçak, the taxation of whom in 1568 did not consist of even one tax relevant to animal husbandry (TT 723, pp. 849-852). The village was taxed for cereals, beehives, and various fees (*niyabet ve resm-i arus*).

59. See above fn. 11.

60. From the rich bibliography on the manufacture of woolen uniforms of Thessaloniki see Benjamin Braude, "The Rise and Fall of Salonica Woollens, 1500-1650: Technology Transfer and Western Competition," in *Jews, Christians, and Muslims in the Mediterranean World after 1492*, ed. A. M. Ginio (London: Routledge, 1992), 216-36.

61. İnalcık, "The Yürüks," 116.

62. The other reason could be the very dense presence of the Athonite properties and that the latter saw Sithonia as a kind of a physically and economically ex-

are due to the choice for the sedentarization or just the wintering of *Yürüks'* flocks.

The *Yürük* populations, starting from zero point in the late 14th century, reached their highest demographic point in the second half of the 16th century, when on the one hand new migratory waves stopped and on the other hand they began to leave the administrative-military system of *Yürüks* and started their fully incorporation into common peasants. Interestingly, while generally in the Ottoman Empire these populations offered mining services they do not seem to have been used in the mines of Halkidiki. Neither has been any information on their involvement in transfer of raw materials or food over long distances. This is explained by the established nature of *Yürüks* and by the fact that they apparently did not possess any transport animals. Moreover, the available information refers to possession of sheep or goats, or even pack-animals (e.g., buffaloes) but not long-distance transport animals (e.g., camels).

The arrival of so many nomads, who were accompanied by their herds, changed the balance –ecological, social and economic– in the region. We can suggest that in those parts of Halkidiki where *Yürüks* settled, permanently or temporarily, it was observed the phenomenon of conversion of arable –or formerly cultivated– land into pastures.⁶³ It is quite characteristic, for example, that while in documents of the 16th century the delimited and clearly specified monastic lands were described as an area of fields (*tarla*), in the 17th century the same area is defined as meadow (*mera*).⁶⁴ This is obviously due to the pressure exercised by *Yürüks* to peasants, so as to provide pasture for their flocks. This change did not necessarily imply population decline neither did it dramatically affect taxation. The peasant (in this case the monastery) was required to pay an annual tax, usually a lump sum for the use of land. During the 17th century the

tension of the Athonite peninsula as it concerns the animal husbandry, similar to the region of Provlaka (in Ierissos), as it concerns the agriculture.

63. Cf. Kotzageorgis, *Η αθωνική μονή*, 86.

64. Cf. the delimitations provided in the documents K/26 (1542) or K/15 (1567) with K/72 (1610).

state (i.e., the tax collector) did not exert strict control regarding the type of land use and the expected tax from it, but it was contented to collect an annual tax. This development, however, is mainly related to the ongoing and –due to financial problems– partial abandonment of cultivation in numerous *metochia*.⁶⁵ The change of cultivated lands into fallow in the early modern era in Halkidiki is an interesting case which asks for more documentation. However, there is indeed more direct evidence that the activity of herds affected the environment. In 1830, the Scottish diplomat and writer, David Urquhart, traveling in Northern Greek peninsula, on his way from Zumbat to Karvya, an area with strong *Yürük* presence, gives the following description of the landscape:

*The country now became barren and dreary; former cultivation had displaced the forests; the recent buildings of the shepherds had destroyed the underwood, and the season of the year had defaced the verdure of the lowly grass.*⁶⁶

The image of a desolate and arid landscape is also given for the whole region until Sofular (today Nea Triglia).⁶⁷ Actually it is a zone both of intense *Yürük* presence and overgrazing.

65. Agriculture retreat in favor of husbandry is a phenomenon generally observed in the Ottoman and Mediterranean world from 17th c. onwards (Hütteroth, “Ecology,” 30-31, where the author connects the phenomenon of the extension of big farms [*çiftlik*s] and the more profitable activity of stock-breeding than the cultivation of fields).

66. David Urquhart, *The Spirit of the East*, vol. II (London: H. Colburn, 1839), 60. Other travelers attributed the desertification of the region to the damages happened during the Greek rebellion in Halkidiki during 1821 (Émile Isambert, *Itinéraire descriptif, historique et archéologique de l’Orient. Première Partie: Grèce et Turquie d’Europe* [Paris 1873], 730). For another observation on the deforestation in the area between the villages Mesimeri and Atmacalı see Denis Feissel et Michel Sève, “La Chalcidique vue par Charles Avezou (avril-mai 1914),” *Bulletin de Correspondence Hellénique* 103 (1979): 248.

67. Urquhart, *The Spirit*, vol. II, 64: [N]othing met the eye but yellow barrenness, where not a vestige, a tree, or a broken rock, interfered with the smoothness of the undulating surface...

Deforestation in Ottoman lands was not due to the action of nomads, but to that of established peasants, who had a higher density compared to the nomads and needed forests for firewood.⁶⁸ Within this framework it can also be understood the use of forest woods as fuel for the furnaces of the mines in Halkidiki.⁶⁹ Since the Ottoman state did not follow an official policy for the forests before the 19th century, as the latter were generally considered public property, their survival or not depended on the peasants lived nearby.⁷⁰ Consequently, any deforestation (e.g., the forest in Kalavros Mountain⁷¹) cannot be attributed only to *Yürük* activity. The quest for pastures brought *Yürüks* into conflict with the peasants. Thanks to the monastic archives we can follow such conflicts only in relation to the *metochia*, but conflicts should have been against other peasants too. The *Yürüks* of Halkidiki did not settle in deserted or sparsely populated areas. Hence the conflict was intense. The economic crisis of the late 16th century contributed to the change of the relations between nomads and peasants. The former, from would-be trespassers of arable lands, become creditors and ultimately users of the lands from which they had been previously prevented to enter and which had been converted to pastureland. The postulated retreat of cultivated lands in relation to livestock growing is an environmental effect of the presence of new residents in Halkidiki. However, the demand by the *Yürüks* for more pasturelands could not be met with their expansion into new territories, since there was not much availability of vacant lands. In contrast, the population growth in the second half of the 16th century exacerbated the problem of demand for pasturelands at the expense of agricultural land. This demand, however, was not caused by the pure nomadic nature of these populations –which did not exist then– but by the demand of the market of Thessaloniki for wool.

68. Hütteroth, “Ecology,” 26.

69. See the article of Elias Kolovos in the present volume: “Mines and environment in Halkidiki: A story from the Ottoman past”.

70. For the forests in Early Modern Greek peninsula see Vaso Seirinidou, «Δάση στον ελληνικό χώρο (15^{ος}-18^{ος} αιώνας). Αναψηλαφώντας μια ιστορία καταστροφής», *Μεσαιωνικά και Νέα Ελληνικά* 11 (2014): 69-88.

71. Bellier et al., *Paysages de Macédoine*, 114.

In an unsigned report on the Kalamaria *metochia* dated from 1924 the situation is described as follows (the emphasis is mine): The whole land of Kalamaria area is characterized by the lightness of the soil, the non-retention of water and the lack of running water, so that *the fertility of the soil, despite its good reputation, is relatively limited* (more in the southern part, less in the northern part). *Low fertility is due to the destruction of woodland, of which very little remains.* Swampy areas, except for some minor ones in the south, do not exist; therefore the climate may be considered rather healthy. The rainy season lasts until spring, the rains afterwards get rare and during the summer scarce. Generally the land is suitable, except for cereals, and for tree cultures that do not require irrigation, in particular vines, mulberry trees and olive trees.⁷² However, how have the *Yürüks* contributed to this situation of low fertility of soil? Is this situation only due to *Yürüks*' herds or due to the continuous and intensive exploitation of the region since at least the middle byzantine period on?

72. Athens, Gennadios Library (American School of Classical Studies), Archive of Konstantinos D. Karavidas, fol. 7.1: «Μελέτη μετοχίων τμήματος Καλαμαριάς», 15/6/1924 (unsigned).